

Editorial Note

'Proceedings of Wagga 2014'

The 38th Annual Condensed Matter and Materials Meeting

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Editor: Tilo Söhnel

The 38th Annual Condensed Matter and Materials Meeting was held at Waiheke Island, Auckland, New Zealand, from 4-7 February, 2014. There were 87 attendees, including international visitors [France, Germany, USA, Taiwan]. A total of 11 invited and 28 contributed oral papers were presented during the two and one half days of scientific sessions. There were also two sessions with a total of 42 poster presentations. All presenters were invited to submit a manuscript (six pages for invited papers and four for contributed papers) for publication in the conference proceedings. Each manuscript was refereed by at least two anonymous reviewers who worked to a set of guidelines made available by the editor. Each accepted publication therefore satisfies the requirements for classification as a refereed conference publication (E1). The organizers would like to thank the reviewers for their time and effort in reviewing manuscripts, which resulted in 8 papers being accepted for publication. The accepted manuscripts are available at the on-line publication section of the Australian Institute of Physics national web site (<http://www.aip.org.au/>).

Organising committee: Tilo Söhnel (chair), Graham Bowmaker, Morgan Allison, Daniel Wilson (all University of Auckland), Dr Ben Ruck (Victoria University of Wellington), Dr Mark Waterland, (Massey University)

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Date: December 2014

Overall Timetable

Tuesday, 4th February

16:00 – 18:00	Registration
17:30 – 18:30	Welcome Drinks at “The Lookout”
18:30	Dinner at “The Lookout”

Wednesday, 5th February

08:50 – 09:00	Opening
09:00 – 10:40	Presentations
10:40 – 11:00	Morning tea
11:00 – 12:50	Presentations
12:50 – 13:50	Lunch
14:00 – 15:50	Presentations
15:50 – 16:10	Afternoon Tea
16:10 – 16:40	Presentation
16:45 – 17:00	Business Meeting
17:00 – 18:30	Poster Session & Drinks from bar
19:00	Dinner – <i>BBQ Buffet</i>
20:30	Quiz night - 'Wagga Trivia'

Thursday, 6th February

09:00 – 10:30	Presentations
10:30 – 10:50	Morning tea
10:50 – 12:40	Presentations
12:50 – 13:50	Lunch
14:00 – 15:30	Presentations
15:30 – 15:50	Afternoon Tea
15:50 – 17:00	Presentations
17:00 – 18:30	Poster Session & Drinks from bar
19:00	Departure to 'The Bay'
19:30	Conference Dinner at 'The Bay'

Friday, 7th February

09:00 – 10:30	Presentations
10:30 – 10:50	Morning Tea
10:50 – 12:20	Presentations
12:20 – 12:30	Closing
12:30 – 13:30	Lunch

2014 Program

Tuesday, 4th February

- 16:00 – 18:00** **Registration**
17:30 **Welcome Drinks** at “The Lookout”
18:30 **Dinner** at “The Lookout”

Wednesday, 5th February

- 08:50 – 09:00** **Opening:** Tilo Söhnel, The University of Auckland
Chairperson: Glen Stewart
- 09:00 – 09:30 wo1 **Adventures in Reciprocal Space – From Laue to Bragg and Back Again**
Allison Edwards, ANSTO, Sydney, Australia **INVITED**
- 09:30 – 09:50 wo2 Enhanced Ferroelectric Response in Strained Perovskites
Joe Trodahl, Victoria University of Wellington, New Zealand
- 09:50 – 10:10 wo3 Weak antilocalisation in topological insulators
Dimitrie Culcer, University of New South Wales, Sydney, Australia
- 10:10 – 10:40 wo4 **The dynamics and critical properties of FePS₃, an Ising-like two- dimensional magnet on a honeycomb lattice**
Andrew Wildes, Institut Laue-Langevin, Grenoble, France **INVITED**
- 10:40 – 11:00** **Morning tea**
- 11:00 – 12:50 **Chairperson:** Sean Cadogan

- 11:00 – 11:30 wo5 **Colour Tunable Light Emission from Organic Field-Effect Transistors**
Heinz von Seggern, Technical University Darmstadt, Germany **INVITED**
- 11:30 – 11:50 wo6 Organic luminescent solar concentrators for solar cells
Nicola Winch, Victoria University of Wellington, New Zealand
- 11:50 – 12:10 wo7 Structural Studies of Phase Transitions in Hybrid Organic-Inorganic Salts with Temperature and Pressure
Jack Binns, The University of Edinburgh, Scotland
- 12:10 – 12:30 wo8 Optically and Electrically Detected Electron Spin Resonance in OLEDs
Andy Edgar, Victoria University of Wellington, New Zealand
- 12:30 – 12:50 wo9 Characterization of a Fluoroperovskite Based Fibre Coupled Optical Dosimeter for Radiotherapy
Jethro Donaldson, Wellington Regional Hospital, New Zealand
- 12:50 – 13:50 Lunch**
- 14:00 – 15:50 Chairperson: Mark Waterland**
- 14:00 – 14:30 wo10 **Towards better understanding of atomically precise gold clusters and titania made using surface modifying agents**
Vladimir Golovko, University of Canterbury, New Zealand **INVITED**

- 14:30 – 14:50 wo11 Low Cost Refractive Index Sensing Using Zirconia Inverse Opal Thin Films
Andrew Chan, The University of Auckland, New Zealand
- 14:50 – 15:10 wo12 Enhanced photocatalytic activity in F-TiO₂: effect of solvent and fluorine modifier towards the morphology of TiO₂
Fariah Abu Bakar, University of Canterbury, Christchurch, New Zealand
- 15:10 – 15:30 wo13 Induced few-electron GaAs Quantum Dots
Lareine Yeoh, University of New South Wales, Sydney, Australia
- 15:30 – 15:50 wo14 SDW and AFM order in single crystal EuFe₂As₂ system under high-pressure using a new ceramic anvil high-pressure cell
Narayanaswamy Suresh, Callaghan Innovation, Wellington, New Zealand
- 15:50 – 16:10 Afternoon Tea**
- 16:10 – 16:40 Chairperson:** John Cashion
- 16:10 – 16:40 wo15 **Tribute to CSIRO Scientists**
Trevor Finlayson, Melbourne University, Australia
- INVITED**
- 16:45 – 17:00 Business Meeting**
Chairperson: Tilo Söhnel
- 17:00 – 18:30 Poster Session**
- 19:00 Dinner - BBQ Buffet**
- 20:30 Wagga Trivia**

Thursday, 6th February

09:00 – 10:30

Chairperson: Roger Lewis

09:00 – 09:30 to1

Toward an Accurate Description of Rare Gas Phases

Peter Schwerdtfeger, Massey University, Auckland, New Zealand **INVITED**

09:30 – 09:50 to2

Total State Designation for Electronic States of Periodic Systems

Dirk Andrae, Freie Universität Berlin, Germany

09:50 – 10:10 to3

Influence of Relativistic Effects on the Melting of Mercury

Elke Pahl, Massey University, Auckland, New Zealand

10:10 – 10:30 to4

Transport Models in Nanofluids

Geoff Willmott, The University of Auckland, New Zealand

10:30 – 10:50

Morning tea

10:50 – 12:40

Chairperson: Vladimir Golovko

10:50 – 11:20 to5

Magnetic properties of rare-earth nitride heterostructures for MRAM devices

Eva-Maria Anton, Victoria University of Wellington, New Zealand **INVITED**

11:20 – 11:40 to6

Magnetically driven electric polarization in frustrated magnetic oxide multiferroics

Narendrakumar Narayanan, University of New South Wales, Canberra, Australia

11:40 – 12:00 to7

Exploring the Properties of Complex Layered Tin Cluster Compounds

Morgan Allison, The University of Auckland

- 12:00 – 12:20 to8 Low-temperature magnetic structure of $\text{Ca}_2\text{Fe}_2\text{O}_5$ determined by single-crystal neutron diffraction
Josie Auckett, The University of Sydney
- 12:20 – 12:40 to9 Magnetolectric coupling in isotopically substituted $\text{TbMn}^{16/18}\text{O}_3$ and RMn_2O_5 (R = Tb, Ho, and Y) explored by Raman light scattering
Clemens Ulrich, University of New South Wales, Sydney, Australia
- 12:50 – 13:50 Lunch**
- 14:00 – 15:30 Chairperson: Peter Schwerdtfeger**
- 14:00 – 14:30 to10 **Stress Controlled Metal-to-Insulator Transitions in Thin Film Vanadium Oxides**
Kevin Smith, The University of Auckland **INVITED**
- 14:30 – 14:50 to11 Freudenbergite – a New Example of Electron Hopping
John Cashion, Monash University, Melbourne, Australia
- 14:50 – 15:10 to12 Crystal and magnetic structure of $\text{Li}_2\text{MnSiO}_4$ and $\text{Li}_2\text{CoSiO}_4$ characterized by neutron diffraction measurement
Zakiah Mohamed, The University of Sydney, Australia
- 15:10 – 15:30 to13 Exotic Physics in Neutron Laue Diffraction
Garry McIntyre, ANSTO, Sydney, Australia
- 15:30 – 15:50 Afternoon Tea**

15:50 – 17:00

Chairperson: Graham Bowmaker

15:50 – 16:20 to14

Condensed phase studies at the THz/Far-IR Beamline at the Australian Synchrotron

Dominique Appadoo, Australian Synchrotron, Melbourne, Australia **INVITED**

16:20 – 16:40 to15

Status Report on SIKA – Taiwan's Cold Neutron Triple-Axis Spectrometer at OPAL

Chun-Ming Wu, National Synchrotron Radiation Research Center, Taiwan

16:40 – 17:00 to16

Polarised Neutrons for Materials Sciences Research at the Australian Nuclear Science and Technology Organisation (ANSTO)

Wai Tung Hal Lee, ANSTO, Sydney, Australia

17:00 – 18:30

Poster Session

19:00 Departure to 'The Bay'

19:30 Conference Dinner at 'The Bay'

Friday 7th February

09:00 – 10:30

Chairperson: Ben Ruck

09:00 – 09:30 fo1

Approaching Metallic Hydrogen by Stealth: Via the High-Hydrides

Neil Ashcroft, Cornell University, USA

INVITED

09:30 – 09:50 fo2

Exploring Jupiter's icy moons with old techniques and big facilities – new insights on sulfuric acid hydrates

Helen Maynard-Casely, ANSTO, Sydney, Australia

09:50 – 10:10 fo3

Large room temperature magnetoresistance in nanogranular materials

Jérôme Leveneur, National Isotope Centre, GNS Science, Wellington, New Zealand

10:10 – 10:30 fo4

Magnetic order in gadolinium manganite probed by ¹⁵⁵Gd-Mössbauer spectroscopy

Glen Stewart, UNSW Canberra, Australia

10:30 – 10:50

Morning Tea

10:50 – 12:20

Chairperson: Clemens Ulrich

10:50 – 11:20 fo5

Enigma of Resonant Inelastic X-ray Scattering (RIXS) data for cuprates

Oleg Sushkov, University of New South Wales, Sydney, Australia

INVITED

11:20 – 11:40 fo6

Upper critical and irreversible fields of polycrystalline CeFeAsO_{1-x}F_x superconductors

Shen Chong, Callaghan Innovation, Wellington, New Zealand

11:40 – 12:00	fo7	Phonons in a highly-correlated electron system: the heavy-fermion superconductor CeCu ₂ Si ₂ <u>Michael Loewenhaupt</u> , Technical University, Dresden, Germany
12:00 – 12:20	fo8	The thermodynamics of high-T _c superconductors <u>Jeff Tallon</u> , Victoria University of Wellington, New Zealand
12:20 – 12:30		Awards and Closing: Tilo Söhnel, University of Auckland
12:30 – 13:30		Lunch
from 12:30 onwards		Shuttle bus departures to Waiheke Wharf

Poster Presentations

Wednesday, 5th February

- wp1 First-principle study of palladium-defect pairing in doped Si
A.A. Abiona and H. Timmers
- wp2 M/TiO₂ Photocatalysts (M=Au, Pd, Pt and Au-Pt) for H₂ Production from Ethanol-Water Mixtures
Z.H.N. Al-Azri and G.I.N. Waterhouse
- wp3 Spin-reorientation in DyGa
R.A. Susilo, J.M. Cadogan, R. Cobas, S. Muñoz-Pérez and M. Avdeev
- wp4 90° Magnetic Coupling in a NiFe/FeMn/biased NiFe Spin Valve Investigated by Polarised Neutron Reflectometry
S.J. Callori, T. Zhu and F. Klose
- wp5 Synthesis and Characterisation of 3DOM ZIF-8 Thin-Films for Optical Gas Sensing Applications
H.K. Chahal, G.M. Miskelly and G.I.N. Waterhouse
- wp6 Novel M-Pt/C (M = Ru, Sn, RuSn) Electrodes for Direct Alcohol Fuel Cells
M. H. Chan and G.I.N. Waterhouse
- wp7 Ni/TiO₂ – A low cost photocatalyst system for H₂ Production from Biofuels
W.-T. Chen and G.I.N. Waterhouse
- wp8 Enriching the properties of Mo-oxide layered hybrids with electron-rich zigzag fused aromatic spacer molecules
I. u-din, S.V. Chong, S.G. Telfer, G.B. Jameson, M.R. Waterland and J.L. Tallon
- wp9 Inorganic/Organic Composites for X-ray Imaging
N. Winch and A. Edgar
- wp10 Mechanical Properties of Tungsten Copper Composites: Direct Measurement by Neutron Diffraction
P.J. Mignone, T.R. Finlayson, S. Kabra, S-Y. Zhang, G.V. Franks and D.P. Riley

- wp11 Novel SERS substrates for the Identification of Adulterants in Milk
P.-H. Hsieh, D. Sun-Waterhouse and G.I.N. Waterhouse
- wp12 ESR studies of Magnetocaloric $\text{PrMn}_{2-x}\text{Fe}_x\text{Ge}_2$
 Q.Y. Ren, W.D. Hutchison, J.L. Wang and S.J. Campbell
- wp13 Investigation of the order parameter of Pr in the filled skutterudite $\text{PrRu}_4\text{P}_{12}$ by soft resonant x-ray diffraction
 F. Li, A.M. Mulders, W.D. Hutchison, M. Garganourakis, Y. Tanaka, K. Nishimura and H. Sato
- wp14 The magnetic properties of $\text{Nd}_2\text{Sn}_2\text{O}_7$
P. Imperia, R.J. Aldus, K.C. Rule and A. Studer
- wp15 Structure and Magnetism Studies of $\text{Cu}_{1-x}\text{Co}_x\text{Sb}_2\text{O}_6$ Solid Solution
H.-B. Kang, C. Ling and T. Söhnel
- wp16 Magnon mediated superconducting pairing in the vicinity of magnetic quantum critical point
Y. Kharkov and O.P. Sushkov
- wp17 Ferromagnetism of Co,Eu Co-doped ZnO and 5%-Co doped TiO_2 Magnetic Semiconductors
 O.J. Lee, X. Luo, W.T. Lee, V. Lauter, G. Triani, S. Li and J.B. Yi
- wp18 Temperature dependence of structural parameters of the layered magnetic glass $\text{Fe}_{0.5}\text{Ni}_{0.5}\text{PS}_3$
 D.J. Goossens, W.T. Lee and A.J. Studer
- wp19 Generalization of the Onsager quantization condition for spin-orbit coupled systems
T. Li and O.P. Sushkov
- wp20 Characterization of the carboxyl groups in graphene oxide
C. Liang, G. Xu and J. Jin
- wp21 Designing new $n = 2$ Sillen-Aurivillius phases by lattice-matched substitutions in the halide and $[\text{Bi}_2\text{O}_2]^{2+}$ layer
S. Liu, P.E.R Blanchard, M. Avdeev, B.J. Kennedy and C.D. Ling

Thursday, 6th February

- tp1 Thermoelectric Properties of Polycrystalline Gadolinium Nitride
T. Maity, H.J. Trodahl, B.J. Ruck, H. Warring and F. Natali
- tp2 Reflectometry as a tool for studying dye molecule orientation in dye-sensitised solar cells (DSCs)
J. McCree-Grey and J.M. Cole
- tp3 Fabrication, Optical and Photocatalytic Properties of TiO₂ Colloidal Crystals
S.E. Park and G.I.N. Waterhouse
- tp4 Alkali metal and alkaline earth metal oxide materials for high temperature CO₂ absorption and desorption studies
A.F. Pavan and C.D. Ling
- tp5 Characterisation of permalloy and magnetite nanopowders
T. Prakash, G.V.M. Williams, J. Kennedy, P.P. Murmu, J. Leveneur, S.V. Chong, P. Couture and S. Rubanov
- tp6 Molecular Dynamics Simulations of Thermal Conductivity of UO₂, PuCrO₃ and PuAlO₃
M.J. Qin, E.Y. Kuo, M. Robinson, N.A. Marks, G.R. Lumpkin and S.C. Middleburgh
- tp7 Influence of Plasma Impurities on the Effective Performance of Fusion Relevant Materials
D.P. Riley^a, M. Guenette^a, A. Deslandes^a, S. C. Middleburgh, G. Lumpkin^a, L. Thomsen^b and C. Corr
- tp8 Novel Magnetic Properties of Rare-Earth Nitrides
B.J. Ruck
- tp9 ⁷⁵As NMR of underdoped CeFeAsO_{0.93}F_{0.07}
S. Sambale, D. Rybicki, G.V.M. Williams and S.V. Chong
- tp10 Influence of Oxygen on the Performance of Organic Field Effect Transistors
L. Kehrer, A. Gassmann, C. Melzer and H. von Seggern

- tp11 Solar Hydrogen Production using Au/TiO₂ Photocatalysts
R. Shalori and G.I.N. Waterhouse
- tp12 Electrical tuning of the hole Zeeman spin splitting in (100) Quantum wells
A. Srinivasan, I. Farrer, D.A. Ritchie and A.R. Hamilton
- tp13 Identifying further inelastic neutron crystal field transitions in ErNiAl₄
G.A. Stewart, W.D. Hutchison, Z. Yamani, J.M. Cadogan and D.H. Ryan
- tp14 Thin-Film Thermopower Measurement System Open for Business
J.G. Storey and N. Suresh
- tp15 Phase transition enhanced thermoelectric performance in Cu₂Se
H. Liu, X. Shi, W. Zhang, L. Chen and S. Danilkin
- tp16 Characterisation of self-supporting submicron-thick graphitic carbon foils with reflection spectroscopy
H. Timmers, C. Jansing, M. Tesch, M. Gilbert, A.G. Muirhead, A. Gaupp^d and H.-Ch. Mertins
- tp17 X-ray Dose Dependence and Spectral Hole-Burning Properties of Ball Milled Nanocrystalline Ba_{0.5}Sr_{0.5}FCl_{0.5}Br_{0.5}:Sm³⁺
X.Wang and H. Riesen
- tp18 Characterising Graphene Nanoribbons using Raman Microscopy
M.R. Waterland, H. Dykstra and A.J. Way
- tp19 Structural Investigation of Tungsten Bronze Type Relaxor Ferroelectrics
T.A. Whittle and S. Schmid
- tp20 Neutron powder diffraction and Synchrotron PD and XAS studies of Cu_{5-x}Mn_xSbO₆ and Cu₅Sb_{1-x}Mo_xO₆
D.J. Wilson and T. Söhnel
- tp21 A novel approach to synthesis of highly reduced graphene oxide
G. Xu, C. Liang, J. Zhang, H. Kang and J. Jin

Extended Abstracts Content

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M. Allison, S. Liu C. Ling G. Stewart and T. Söhnel
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J. D. Cashion, A. Lashtabeg, E. R. Vance, D.H.Ryan and J. Solano
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- 5 Exploring the Structural and Magnetic Phase Transition of $\text{Cu}_{1-x}\text{Co}_x\text{Sb}_2\text{O}_6$
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- 6 Identifying Further Inelastic Neutron Crystal Field Transitions in ErNiAl_4
G.A. Stewart, W.D. Hutchison, Zahra Yamani, J.M. Cadogan and D.H. Ryan
- 7 Structural Investigation of Tungsten Bronze Type Compounds in the Relaxor Ferroelectric $\text{Sr}_3\text{Ti}_{1-y}\text{Zr}_y\text{Nb}_4\text{O}_{15}$ System
T. A. Whittle and S. Schmid
- 8 Synchrotron and Neutron Powder Diffraction and XANES Studies of $\text{Cu}_{5-x}\text{Mn}_x\text{SbO}_6$
D. J. Wilson and T. Söhnel